

CLAIMS

1. A method for selecting an eye image from a set of digital images based on its definition, consisting, for each image in the set, of:
 - 5 calculating (4) a first approximate characteristic definition score (AF) based on a cumulating of the gradients in a single direction of the light intensities of the image pixels;
 - selecting a subset of images for which said first score is greater than a predetermined threshold; and
 - 10 for each of the images of said subset, calculating a second score characteristic of the image definition by an evaluation method comprising the successive steps of:
 - approximately localizing (5) the pupil in the image;
 - defining (56), from the approximate position of the pupil, an examination window (EI) centered on this position; and
 - 15 applying (6) a gradient accumulation operation to the luminance values of the pixels of the examination window, the running total being proportional to the definition score of the image.
2. The method of claim 1, wherein the examination window has an elongated shape, preferably, rectangular.
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3. The method of claim 2, wherein the smallest dimension of said examination window approximately corresponds to the average diameter expected for the pupil.
4. The method of claim 1, wherein the largest dimension of said examination window approximately corresponds to the average diameter expected for the iris.
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5. The method of claim 1, wherein the approximate localization comprises the steps of:
 - dividing the image into blocks of identical dimensions, the size of which is chosen according to the approximate expected size of the pupil to be localized;
 - 30 calculating, for each block, the average luminance; and
 - searching that of the blocks having the smallest luminance, the approximate

position of the pupil in the image corresponding to the position of the block of minimum luminance.

6. The method of claim 5, wherein the blocks overlap, the pitch in both
5 directions between two neighboring blocks ranging between one tenth and three quarters
of the size of a block.

7. The method of claim 5, wherein the division is performed on a sub-sampled
image of the digital image, the pitch between two neighboring blocks depending on the
10 image sub-sampling ratio.

8. The method of claim 5, wherein the localization is applied to a digital
image reduced in size with respect to the original image, by eliminating two lateral strips
of predetermined width.

15 9. The method of claim 1, wherein said operator cumulates the quadratic norm
of horizontal and vertical gradients of luminance values of image pixels, the pixels being
selected at least according to a first maximum luminance threshold of other pixels in the
involved direction.

20 10. The method of claim 9, wherein said score is obtained by dividing the
running total by the number of cumulated quadratic norms.

11. The method of claim 9, consisting of selecting a current pixel having a
25 vertical or horizontal gradient to be taken into account in the total only if the luminances
of two pixels surrounding the current pixel while being distant therefrom by a
predetermined interval in the involved vertical or horizontal direction are smaller than
said first luminance threshold, said first threshold being selected according to the
expected luminosity of possible specular spots which are desired not to be taken into
30 account, and said interval being selected according to the expected size of the possible
specular spots.

12. The method of claim 9, wherein the quadratic norm of a gradient is taken into account in the total only if its value is smaller than a predetermined gradient threshold, selected according to the image contrast.

5 13. The method of claim 9, wherein a current pixel is selected to be taken into account in the total only if its luminance is smaller than a second luminance threshold, chosen to be greater than the expected light intensity of the iris in the image.

10 14. The method of claim 1, wherein the second score assigned to each image is used to select the clearest image from said set.

15. A digital image processing system, comprising means for implementing the selection method of any of claims 1 to 14.